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Washington, D.C. 20231

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 43

Application Number: 08/472,876
Filing Date: 06/07/1995
Appellant(s): Garcia et al.

Robert L Showalter
For Appellant

EXAMINER'S ANSWER

This is in response to appellant's brief on appeal filed 04/16/2001.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The amendment after final rejection filed on 12/21/2000 (paper #37) has been entered.

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 14, 15, 31, 33. 34, 35, 37, 38, 40, 43, 44, 46-49, 45, 51-53 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

4,845,758	Op de Beek et al	07/1989

Tremaine, Howard M. "Audio Cyclopedia", second edition, Howard W. Sams & Co., Inc., pp. 20-23.

Furui, Sadaoki "Digital Speech Processing, Synthesis, & Recognition", Tokai University Press, pp. 25-29.

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 31, 33-34, 43, 35, 37, 14, 44, 40, 45 and 51-53 are rejected under 35 U.S.C. 102(b). This rejection is set forth in prior Final Office action, Paper No. 39.

Claims 15, 38 and 46-50 are rejected under 35 U.S.C. 103(a). This rejection is set forth in prior Final Office action, Paper No. 39.

Note: It is noted the Examiner inadvertently omitted claim 50 in the previous Final Rejection (paper #39). Claim 50 claiming the same subject matter as claims 46-49 and is also rejected under 35 U.S.C. 103(a) for the same reasoning as set forth in claims 46-49.

Claims 2, 5, 9, 24 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. This objection is set forth in prior Final Office action, Paper No. 39.

(11) Response to Argument

Before response to applicant's argument, the Examiner would like to present an analysis of independent claims 31, 35, and 40 as follow:

Independent claims 31 and 40 call for an apparatus comprising:

1. a source of input audio signal produced from audio sound having a band of frequencies with a high end and a low end;

2. a circuit connected to the source to receive the input audio signal and adapted to distorts the input audio signal to generates an enhanced audio signal with a characteristic of increase in amplitude as per increasing frequencies from a reference frequency up to an amplitude peak at a high frequency and, after the high frequency, decrease in amplitude as per increasing frequencies toward high end, and the reference frequency separates the band of frequencies into a band of high frequencies and a band of low frequencies, whereby an enhanced audio signal is produced and exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound produced from the input audio signal.

Independent claims 31 and 40 therefore including two elements: 1. an input audio signal from a source, this limitation is interpreted as an input audio signal from any audio source; 2. a circuit (without limiting to what particular kind or type of circuit in the claim) to

generates/reproduces an output signal (enhanced audio signal as claimed) with a *characteristic of increase in amplitude as per increasing frequencies from a reference frequency up to an amplitude peak at a high frequency and, after the high frequency, decrease in amplitude as per increasing frequencies toward high end, and the reference frequency separates the band of frequencies into a band of high frequencies and a band of low frequencies* (the claims did not including any specific about the reference frequency, and it is interpreted as one particular point along the audio signal at a particular frequency with the amplitude of the audio signal at that particular point is at peak), *and the output audio signal is produced that is recognizable as the input signal.*

Independent claim 35 is similar to claim 31 except for being couched in method terminology; such methods would be inherent when the structure of claim 30 is shown in the references.

The followings are response to applicant's argument as present in the Brief:

a) The amendment (paper #37) filed concurrent with this appeal brief has been entered and rendered the rejection under 35 U.S.C. 112 2nd paragraph for claims 51-53 in the previous final rejection (paper #29) moot.

b) FURUI AND CLAIMS 14, 15, 31, 33-35, 37, 38, 40, 43 and 44

Applicant's argument on page 5 of the Brief regarding Furui does not disclose, teach or suggest "a circuit for producing an enhanced audio signal that is recognizable as being the input audio signal" is noted; however, as recited in Furui's text and Figs. 3.1 and 3.2, the ordinary formant synthesis is by feeding tonal (voiced sound source) or white noise (unvoiced sound source) signal into articulation model (i.e., multistage band pass filter) to synthesize consonants (unvoiced sounds). The peak value of the source wave corresponds to the loudness of the voice for the voiced sound source, and the mean energy of the white noise which corresponds to the loudness of the voice, in other words, the loudness or amplitude of the output of the synthesized consonants (i.e., output audio signal) should have depending on the peak value or the mean energy of the input source (voiced or unvoiced source), and this clearly can be read on as the enhanced/output audio signal (with various peaks) that is recognizable as being the input audio signal from at least the loudness of the input source (which is depending on the peak value or mean energy as stated above) (see page 25, lines 4-11 of second paragraph).

FURUI AND CLAIMS 45 and 51-53

Applicant's argument on page 5 of the Brief regarding Furui indicates "that the input signal is a pulse or white noise, ***not a speech or vocal signal***" is noted; however, Furui indicates **a voiced sound source** can be modeled by a generator of pulses or asymmetrical triangular waves which are repeated at every fundamental period (see page 25, lines 1-4 of second paragraph). The voiced sound source is clearly a speech or vocal signal.

FURUI AND CLAIMS 46-49

Applicant's argument on page 6 of the Brief regarding there is not disclosure, teaching or suggestion in Furui "to produce a frequency response curve having a total of only one or two significant amplitude peaks, or that such a response curve would ever be produced by the Furui invention" is noted; however, it is well know in the audio art to use various types of filter, i.e., low, band, or high pass filter, to extract desired audio frequency band for signal processing. In this case, to use different band pass filter(s) to extract desired frequency bands with various amplitude peaks (i.e., a particular number or peak(s) for the output/enhanced audio signal of Furui as shown in Fig. 3.1 would have been considered obvious to one of ordinary skilled in the art.

c) OP DE BEEK ET AL. AND CLAIMS 14, 15, 31, 33-35, 37, 38, 40, 43 and 44

Applicant's argument on page 7 of the Brief regarding there is no teaching or suggestion in Op de Beek et al. patent that "adjusted equalizer 1 will distort an input audio signal so as to produce an enhanced audio signal that, when converted into audio sound, exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound reproduced form the input audio signal" is noted; however, it is clearly contrary to what applicant has asserted that Op de Beek et al., in Col. 1, lines 33-41 and Col. 11, line 37-Col. 12, line 56, discloses an equalizer circuit to produce audible sound that exhibits a flat response when perceived or detected (lines 4-8 on the last paragraph of page 7 of the Brief).

Col. 1, lines 33-41 of Op de Beek et al. merely stated the general problem associates with the transmission of an audio system in a space by means of improper equalization by an equalizer, would have generate distortion and an unnatural sound. And Col. 11, line 37-Col. 12, line 56 of Op de Beek et al. shows or explaining the equalizer being control and equalize an input acoustic signal with a loudspeaker for converting output audio signal into a space, and the frequency characteristic is shown as in Fig. 12a-12c, an input audio signal from input terminal 87 would have distorted by equalizer 1 with control signals 86 which setting the filters of equalizer 1 to generates an distorted output audio signal with a transfer function characteristic of Fig. 12a, also contrary to what applicant asserted as the equalizer of Fig. 11 would have provide the listener with an **undistorted** audio signal. And the frequencies characteristic of the output audio signal as shown in Fig. 12 clearly meet the claimed limitation of claims 31, 35, and 40.

OP DE BEEK ET AL. AND CLAIMS 46-49

Applicant's argument on page 8 of the Brief regarding Op de Beek "shows more than one or two amplitude peaks between the low end and the high end" is noted; however, it is well know in the audio art to use various types of filter, i.e., low, band, or high pass filter, to extract desired audio frequency band (or frequency range) for signal processing. In this case, to use different band pass filter(s) to extract desired frequency bands with various amplitude peaks (i.e., a particular number or peak(s) for the output/enhanced audio signal of Op de Beek as shown in Fig.12a would have been considered obvious to one of ordinary skilled in the art.

d) AUDIO CYCLOPEDIA AND CLAIMS 14, 15, 31, 33-35, 37, 38, 40, 43 and 44; CLAIMS 46-49; AND CLAIMS 45 AND 51-53

Applicant's argument on page 9 of the Brief regarding the Audio Cyclopedia does not teach or suggest "how to use a Fletcher-Munson curve to design any device concerned with human hearing or a circuit for enhancing an input audio signal such that the transfer function of the circuit follows that of a Fletcher-Munson curve" is noted; however, as stated in col. 1, page 20, the Fletcher-Munson curve is generally accepted throughout the sound industry as a basis for the design of devices (i.e., circuit as claimed) concerned with human hearing. It is used to ensure equal phons (i.e., equal subject loudness at all frequencies) for listeners. The Fletcher-Munson curve is the basic sensitivity curves in regard to frequencies characteristic for human ear in response to different intensity level between the threshold of hearing and the threshold of feeling and generally implement in various devices/circuits (i.e., electronic circuit such as hearing aid, for example) to ensure human ear hearing within equal phons. The response of the implemented device/circuit according to the Fletcher-Munson curve would have produced results as describes in claims 14, 15, 31, 33-35, 37, 38, 40, 43 and 44.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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October 18, 2001

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